



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

057

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID P. LITTELL  
COMMISSIONER

MEMORANDUM

**TO:** Board of Environmental Protection  
**FROM:** Jeffrey S. Crawford, Bureau of Air Quality  
**DATE:** June 1, 2006  
**RE:** State Implementation Plan (SIP) Submittals- Redesignation of the Portland 8-Hour Ozone Nonattainment Areas, Redesignation of the Midcoast 8-Hour Ozone Nonattainment Area, Section 110 Maintenance Plans

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Statutory and Regulatory Reference:

A Statutory authority

38 MRSA Section 585-A provides that the Board of Environmental Protection "may establish and amend regulations to implement ambient air quality standards and emission standards. These regulations shall be designed to achieve and maintain ambient air quality standards and emission standards within any region and prevent air pollution."

Section 107(a) of the 1990 Clean Air Act Amendments (CAA) provides that "Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which national ambient primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State."

Section 110 of the CAA provides that each state shall, after reasonable notice and public hearing, adopt and submit a plan which provides for the implementation, maintenance and enforcement of national ambient air quality standards. This plan, known as a State Implementation Plan (SIP) consists of the regulations and planning documents a state has developed to meet these air quality standards. As the rulemaking body of the Department of Environmental Protection, the Board may hold public hearings, and has traditionally been responsible for approving non-regulatory SIP submittals.

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**B. Specific legal mandates requiring adoption.**

There are no specific legal mandates requiring the redesignation of the Portland or Midcoast 8-hour ozone nonattainment areas. Section 110(a)(1) of the CAA and EPA regulations at 40 CFR Parts 51.905(c) and (d) collectively establish anti-backsliding (or maintenance) requirements for areas designated as attainment for the 8-hour ozone standard

**Location/Applicability:**

The proposed SIP amendments will apply in York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Lincoln, Knox, Waldo and Hancock counties.

**Description:**

**Ozone Nonattainment In Maine**

Under the 1990 Clean Air Act Amendments nine Maine counties were designated as nonattainment of the national ambient air quality standard (NAAQS) for ozone. York, Cumberland and Sagadahoc counties (Planning Area 1); Androscoggin and Kennebec counties (Planning Area 2), and Knox and Lincoln counties (Planning Area 3) were designated as "moderate" nonattainment, while Waldo and Hancock counties (Planning Area 4) were designated as "marginal" nonattainment for ozone.

On July 16, 1997, EPA issued updated final air quality standards for ozone. After an extensive scientific review, EPA concluded that the 1-hour ozone standard did not provide sufficient health protection against extended periods of moderately elevated ozone. The new 8-hour ozone NAAQS is based on an 8-hour average of ozone concentrations and more directly relates to ozone concentrations associated with health effects.

The 8-hour ozone NAAQS was the subject of numerous legal challenges, which delayed its implementation for several years, with EPA ultimately issuing 8-hour ozone NAAQS designations on April 30, 2004. Maine has two 8-hour nonattainment areas. The Portland Nonattainment area consists of the 56 cities and towns comprising York, Cumberland and Sagadahoc Counties along with Durham, Maine in Androscoggin County, and has been designated as "marginal" nonattainment for the 8-hour ozone standard. The Midcoast Nonattainment Area is comprised of 55 coastal towns and islands in Hancock, Knox, Lincoln and Waldo counties, and has been designated as a "Basic/General" nonattainment area for the 8-hour ozone standard.

Both the Portland and Midcoast Nonattainment Areas are now meeting the 8-hour ozone standard, and are eligible for redesignation to "attainment."

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<sup>1</sup> Formally known as the Knox, Hancock, Lincoln and Waldo County, Maine Nonattainment Area

### **The Redesignation Process**

Under Section 107 of the CAA, a state may redesignate areas that are no longer violating the ozone standard upon satisfaction of several conditions, namely:

- The area has attained the national ambient air quality standard
- The area has a fully approved implementation plan
- The improvement in air quality is due to permanent and enforceable reductions in emissions resulting from state and federal programs
- The area has a fully approved maintenance plan, and
- The area has met all requirements under Section 110 (Implementation Plans) and Part D (Plan Requirements for Nonattainment Areas) of the CAA

Maine has fulfilled all of these requirements for both the Portland and Midcoast Nonattainment Areas, and has prepared these redesignation requests in close cooperation with EPA.

### **Section 110 (a)(1) Maintenance Plans**

Section 110(a)(1) of the CAA requires states to adopt and submit a plan providing for implementation, maintenance and enforcement of a primary air quality standard (i.e., ozone) for all areas within the state. As part of their implementation for the 8-hour ozone standard, EPA established requirements to ensure that areas meeting the 8-hour ozone standard, but formerly designated as either nonattainment or attainment with an approved maintenance plan for the 1-hour ozone standard do not "backslide" or see decreased air quality. Section 110 (a)(1) Maintenance Plans are required for those portions of York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Lincoln, Knox, Waldo and Hancock counties that are not within the Portland or Midcoast 8-hour Nonattainment Areas.

The Section 110 (a)(1) Maintenance Plans must include

- An Attainment Inventory
- A Maintenance Demonstration
- Continued Ambient Air Quality Monitoring
- Contingency Plan; and
- Verification of Continued Attainment.

Key to the maintenance plan is a demonstration that each area will remain in compliance with the 8-hour ozone standard for at least 10 years following designation as an unclassifiable/attainment area. The Department has used emissions inventories to demonstrate that future emissions of ozone precursors (volatile organic compounds and nitrogen oxides) will not exceed 2002 levels through 2016. All things being equal, stable or declining emissions of ozone precursors will ensure that these areas will continue to meet 8-hour ozone air quality standards.

### **Environmental Issues:**

Redesignation creates an "emissions budget" for the volatile organic compounds (VOC) and nitrogen oxides (NOx) in the Planning Area. This emissions budget is intended to keep future emissions below this level to assure that the air quality is "maintained" and does not lapse back

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into nonattainment for at least 10 years. The actual budget is developed by applying growth factors to the various emissions source categories, and showing that future year emissions for point, area and mobile sources are below the redesignation base year (2005). In addition to ensuring maintenance of air quality (all other things being constant), the emissions budget also establishes caps that are used in transportation conformity.

**Departmental Recommendation:**

The Department recommends that the Board hold a public hearing on these proposed amendments to the State Implementation Plan on July 6, 2006.

**Estimated Time of Presentation:**

20 minutes

## **Request for Redesignation of the Portland, Maine 8-Hour Ozone Nonattainment Area**

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## **Request for Redesignation of the Portland, Maine 8-Hour Ozone Nonattainment Area**

### **1.0 INTRODUCTION**

This submittal supports a request from the Maine Department of Environmental Protection (MEDEP) to the Environmental Protection Agency (EPA) for the redesignation of the Portland, Maine 8-Hour Ozone Nonattainment Area (Portland Nonattainment Area) to attainment of the 8-hour ozone standard. Ozone monitoring data from 2003-2005 show these counties are now in attainment for the 8-hour ozone standard.

Section 107 of the 1990 Clean Air Act Amendments (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation, including:

- (a) A determination that the area has attained the 8-hour ozone standard;
- (b) An approved State Implementation Plan (SIP) under Section 110(k) of the CAA;
- (c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements;
- (d) A fully approved maintenance plan under Section 175(A); and
- (e) A determination that all Section 110 and Part D requirements have been met.

This document addresses each of these requirements and provides additional information to support continued compliance with the 8-hour ozone standard.

#### **1.1 Initial Designation of the Portland Nonattainment Area**

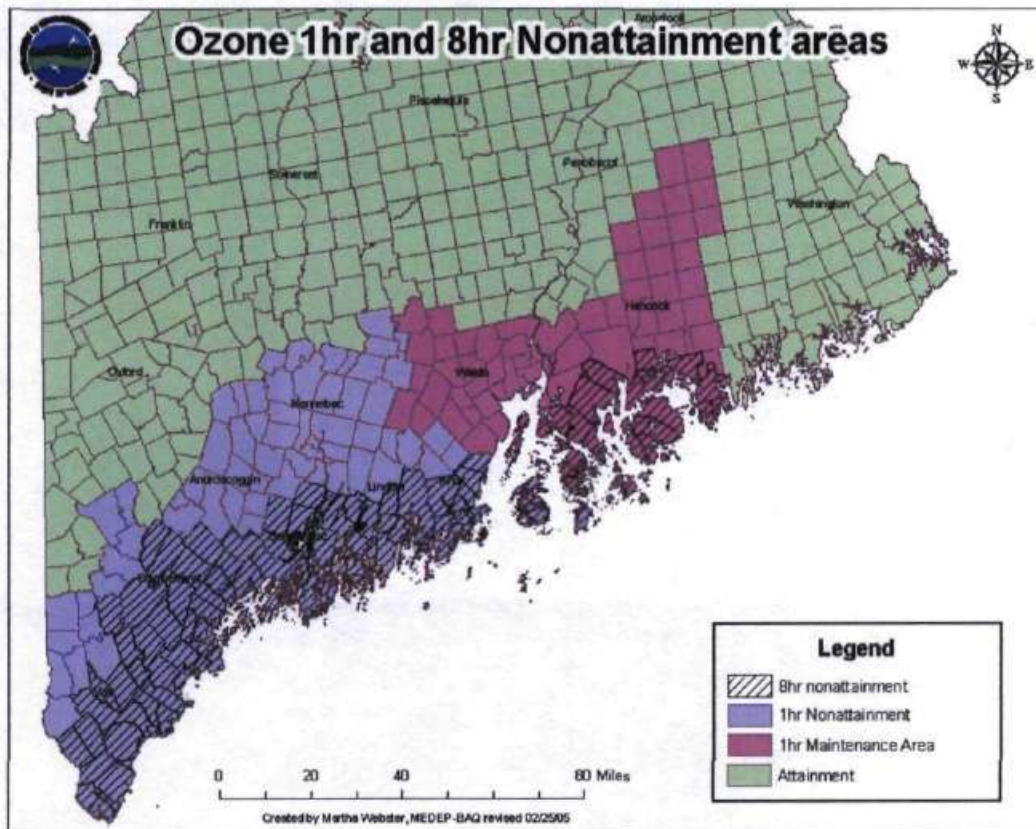
Under the 1990 Clean Air Act Amendments (CAAA) nine Maine counties were designated as nonattainment of the old 1-hour national ambient air quality standard (NAAQS) for ozone: York, Cumberland and Sagadahoc counties (Planning Area 1); Androscoggin and Kennebec counties (Planning Area 2), and Knox and Lincoln counties (Planning Area 3) were designated as "moderate" nonattainment, while Waldo and Hancock counties (Planning Area 4) were designated as "marginal" nonattainment for ozone.

On July 16, 1997, EPA issued updated final air quality standards for ozone. After an extensive scientific review, EPA concluded that the 1-hour ozone standard did not provide sufficient health protection against extended periods of moderately elevated ozone. The new 8-hour ozone NAAQS (set at a level of 0.08 parts per million (ppm)) is

based on an 8-hour average of ozone concentrations and more directly relates to ozone concentrations associated with health effects.

The 8-hour ozone NAAQS was the subject of numerous legal challenges, which delayed its implementation for several years, with EPA ultimately issuing 8-hour ozone NAAQS designations on April 15, 2004. Maine has two 8-hour nonattainment areas. The Portland Nonattainment area consists of the 56 cities and towns comprising York, Cumberland and Sagadahoc Counties along with Durham, Maine in Androscoggin County, and has been designated as “marginal” nonattainment for the 8-hour ozone standard<sup>1</sup>.

The previous 1-hour ozone maintenance and nonattainment areas and the current 8-hour ozone nonattainment areas are illustrated in Figure 1.



**Figure 1**

<sup>1</sup> The other 8-hour ozone nonattainment area is the Hancock, Knox, Lincoln and Waldo Counties “Subpart 1, Basic” nonattainment area consisting of coastal towns and islands in these counties.

## **1.2 Description of the Portland Nonattainment Area**

The Portland Nonattainment Area consists of 56 coastal towns and cities in Sagadahoc County and portions of York, Cumberland, and Androscoggin Counties, and has been designated as "marginal" nonattainment for the 8-hour ozone standard (Figure 1). According to the 2000 census, these communities have a total population of 490,949. Portland is the largest municipality in the area, with a population of 64,249, followed by South Portland and Brunswick at 23,324 and 21,172, respectively.

## **1.3 Status of Air Quality**

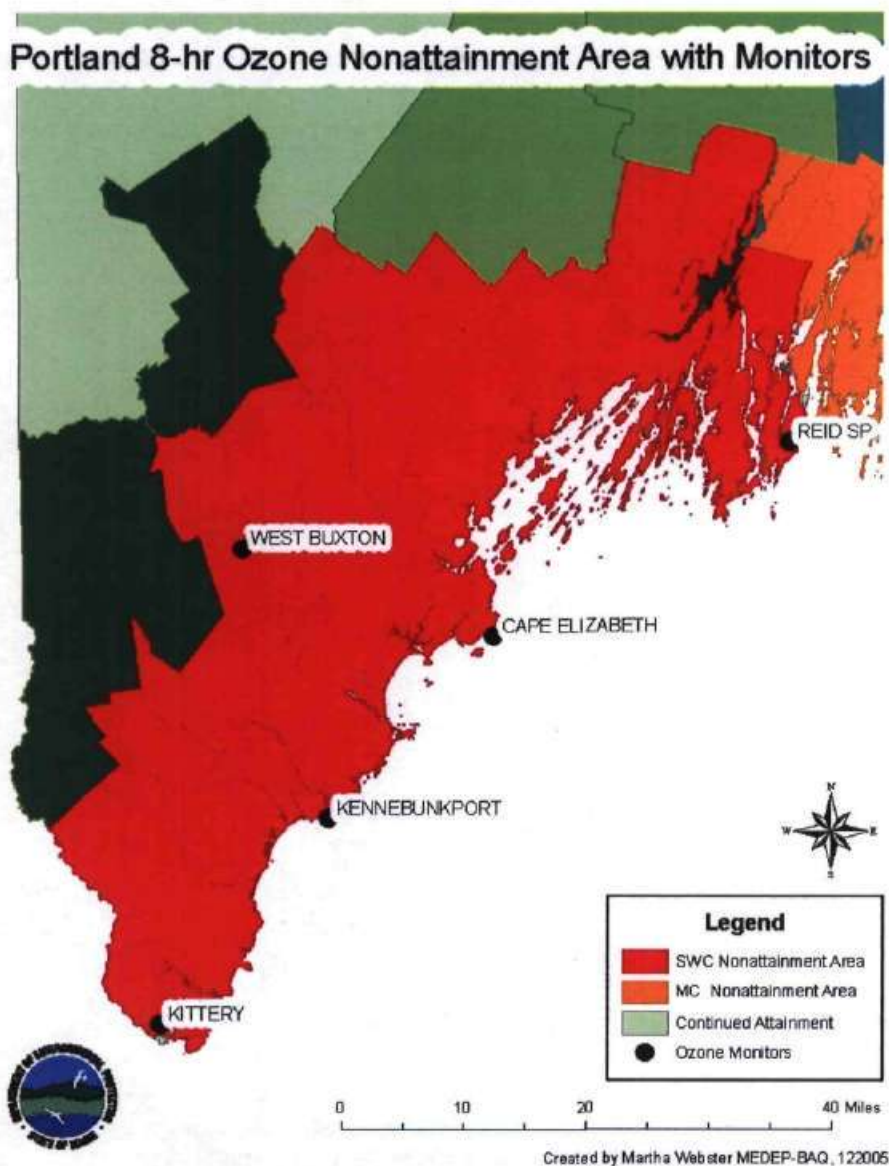
Ozone monitoring data for the most recent three (3) years, 2003 through 2005, demonstrates that air quality in the Portland Nonattainment Area has met the NAAQS for ozone. This fact, accompanied by the decreases in emission levels discussed in Section 4, justifies a redesignation to attainment for the nonattainment area based on Section 107(d)(3)(E) of the CAAA.

# **2.0 ATTAINMENT OF THE STANDARD**

## **2.1 Ozone Monitoring Network (sites) and Data**

Maine's ozone monitoring network currently consists of 15 monitors statewide, which operate during the ozone season (April 1 through September 30). Five of these monitors are located within York, Cumberland, and Sagadahoc counties (Figure 2) in the Portland Nonattainment Area. The Kittery, Kennebunkport, Cape Elizabeth, and Reid State Park monitors are located along the coast while the West Buxton monitor is located approximately 20 miles inland.

Ozone data is used in a variety of analyses including a determination of whether or not areas are meeting the 8-hr Ozone NAAQS. Appendix A includes 8-hour ozone data handling conventions and a table of the 4<sup>th</sup> high values, design values and 2006 threshold values at Kittery, Kennebunkport, West Buxton/Hollis, Cape Elizabeth and Reid State Park/Phippsburg sites. Ozone concentrations at these sites represent ozone levels for the entire Portland 8-hour ozone nonattainment area.



**Figure 2**

Figure 3 displays the region's 4<sup>th</sup> high values since 1981. While yearly variations occur due to meteorological conditions, it is clear that ozone values in this area are trending downward. It is important to note that all data has met all quality assurance requirements and has been entered into the AQS database.

The threshold analysis<sup>2</sup>, included in Table A-1 of Appendix A, further demonstrates that the Portland Nonattainment Area is likely to remain attainment once redesignated. It has

<sup>2</sup> The threshold value is the 4<sup>th</sup> high monitored daily maximum 8-hour ozone value during the 2006 ozone season which would cause the 2004-2006 design value to exceed the 8-hour ozone NAAQS.

been more than 10 years since any site in this area has exceeded the current threshold for 2006. Furthermore, the NO<sub>x</sub> SIP call has reduced emissions of NO<sub>x</sub> in the region thus enhancing the likelihood that the area would maintain attainment.

Portland Nonattainment Area Yearly 4th High Ozone

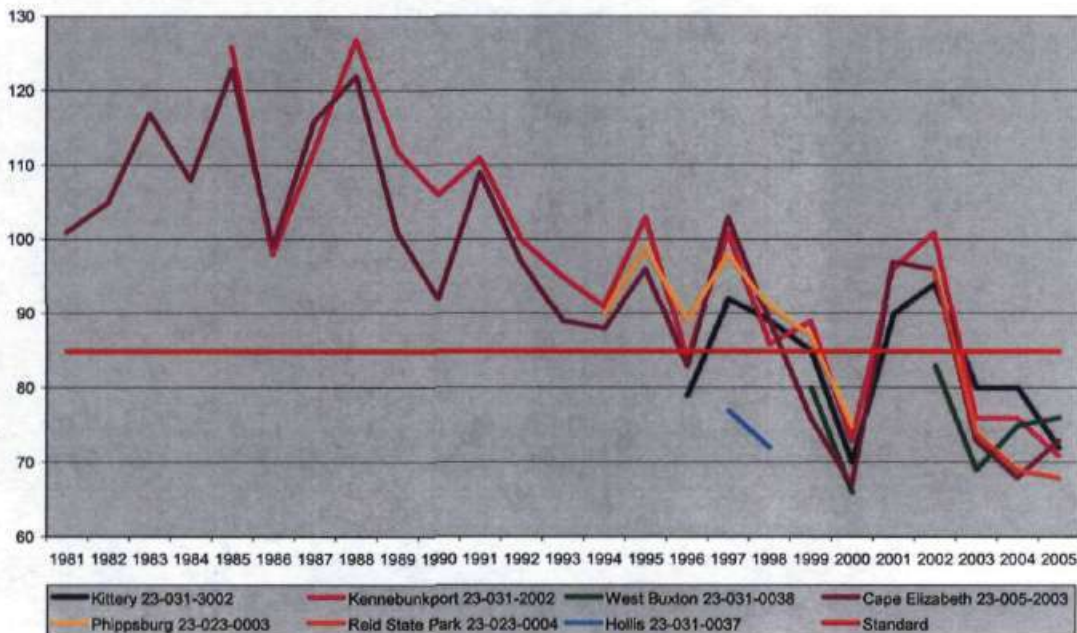


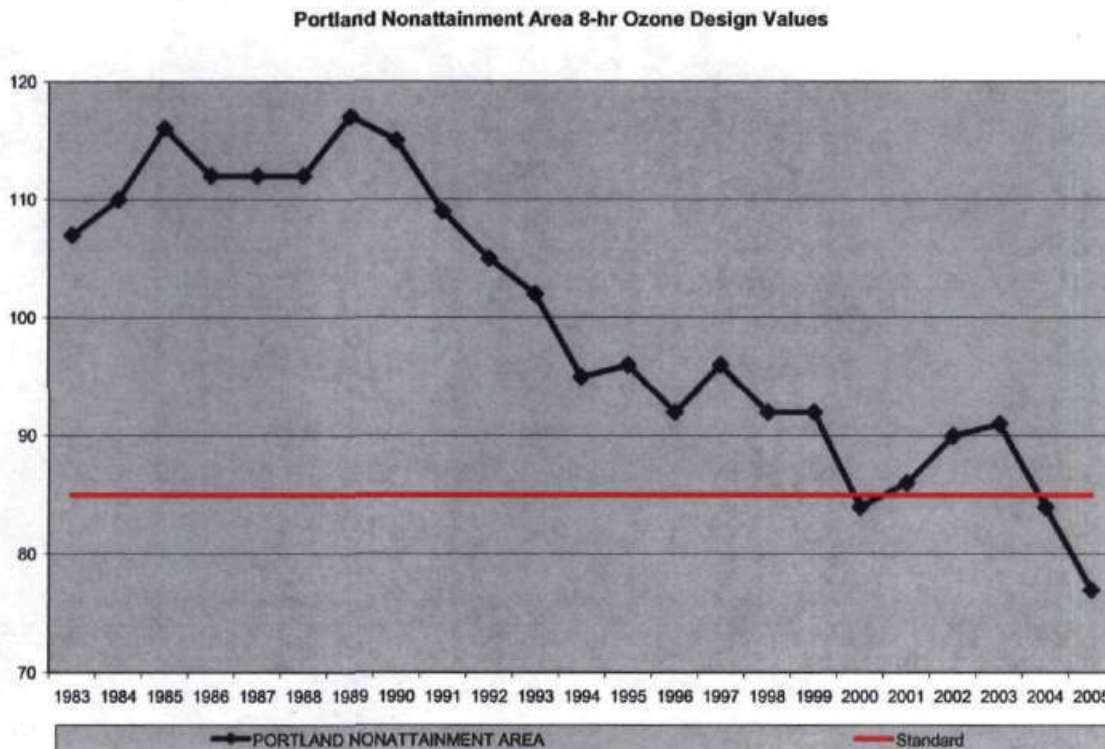
Figure 3

## 2.2 Design Value

The 8-hour ozone design value is the average of the 4<sup>th</sup> highest 8-hour concentration in a 3 year period at a monitored location (see Appendix A for a more technical discussion of data handling conventions and design value calculations). Figure 4 shows the trend of the yearly maximum design value from the monitors in the Portland Nonattainment Area. Eight-hour ozone design values have been declining since 1989. Both the 2002-2004 and the 2003-2005 design values at all 5 monitors are below the 8-hour ozone standard.

## 2.3 Summary of Chemical Analyses

Photochemical assessment monitoring stations (PAMS) monitor chemicals associated with ozone formation, ozone and meteorological data. The data from sites in Maine and Massachusetts has been analyzed by MEDEP staff meteorologists. Background information, a description of the analysis and graphs of the chemical data is included in Appendix B. The meteorological portion of the analysis is included in Appendix C. As part of the analysis many graphs and charts were created to visually depict trends in these parameters. Only the most pertinent are included in the appendices.



**Figure 4**

The PAMS average concentrations are all trending downward for the Portland Nonattainment Area and upwind sites. Therefore, this data demonstrates that the Portland Nonattainment Area is not likely to exceed the ozone NAAQS in future years.

#### 2.4 Summary of Meteorological Analysis

As required by EPA guidance for the redesignation process, MEDEP must show evidence for each area that unusual weather conditions would not have accounted for the newly acquired attainment status.

Meteorology is a major factor in the formation and transport of ozone and its precursors. High ozone concentrations in southern Maine occur most often when low pressure systems approach from the Great Lakes or southern Canada while high pressure is situated just off the eastern seaboard. When such a scenario is in place, it provides warm temperatures, clear skies, and southwesterly winds to allow the transport of ozone and its precursors into the Northeast.

Therefore, it is not surprising that the meteorological parameters most closely associated with high ozone levels in the Portland Nonattainment Area are: daily temperatures in the upper 80's or higher, little cloud cover, lack of precipitation and southwesterly surface winds of approximately 10 knots. These conditions bring ozone and its precursors from

large urban areas in the northeast to Maine. A westerly wind at the 850 mb level can occur simultaneously bringing additional ozone and its precursors from the midwest

Appendix C includes the descriptions and the visual results of the following meteorological analyses

- Temperature versus ozone plots for several New England states
- Trajectory analyses of ozone events
- Streamline analysis of non ozone events
- Graphs of meteorological data collected from PAMS sites
  - o wind frequency during ozone events
  - o wind speed in general and during events.
- Annual anomaly plots for various parameters both at the surface and aloft

These meteorological data analyses illustrate that exceedance days in Maine occur when the surface wind has a southwesterly component along with a westerly wind component at the 850 mb level. These directions indicate that ozone and its precursors are transported from larger metropolitan areas into York, Cumberland, and Sagadahoc counties on exceedance days.

While the summer of 2005 was marked by many hot sunny days in Maine, the surface wind direction and wind speeds aloft were not as conducive to transport ozone and its precursors to Maine. Historically, ozone levels have exceeded the standard even during marginally favorable transport conditions. This is no longer the case. As ozone and its precursors are reduced upwind, conditions that result in exceedances in Maine are becoming more restrictive.

Even though temperatures during the peak of the 2005 Ozone season were above normal, ozone levels in Maine were similar to the cooler summers of 1996, 2000, 2003 and 2004. This was a result of reduced ozone and precursors available to be transported to Maine along with less favorable transport conditions. There has been a clear decline in the number of ozone exceedances in Maine over the last 17 years. Thus, monitored attainment of the Portland Nonattainment Area is not primarily due to unusual meteorological conditions.

In the event that meteorological conditions during future summers again favor transport to Maine, ozone levels in the Portland Nonattainment Area are less likely to exceed the NAAQS due to the fact that the NOx SIP Call went into effect in 2003. Furthermore, the upwind source regions impacting Maine (i.e. southern New England and the New York metropolis) have higher and more frequent ozone exceedances and are taking additional steps to reduce contribution to their own ozone problems. These steps will further reduce the amount of ozone and its precursors available for transport to Maine.

### **3.0. STATE IMPLEMENTATION PLAN FOR THE PORTLAND NONATTAINMENT AREA**

#### **3.1 Reasonably Available Control Technology Requirements**

Under Section 182(b)(2) of the CAAA for each of Maine's 1-hour moderate ozone nonattainment areas, Maine was required to adopt reasonably available control technology (RACT) rules for volatile organic compound (VOC) sources covered by Control Technique Guidelines (CTGs) issued before and after enactment of the 1990 CAAA. In addition, Section 182(b)(2)(C) of the 1990 CAAA requires States to require implementation of RACT with respect to all major sources of volatile organic compounds (VOCs) in moderate ozone nonattainment areas or in areas with higher than moderate nonattainment classifications. Maine met these requirements through the adoption of various VOC regulations and VOC RACT determinations for each of the major VOC sources in the moderate nonattainment areas that were not covered by a CTG.

Furthermore, section 182(f) states that, "the plan provisions required under this subpart for major stationary sources of volatile organic compounds shall also apply to major stationary sources of oxides of nitrogen." This section of the CAAA, established the requirement for Maine to submit a NOx RACT regulation for the Portland 1-hour ozone nonattainment which covers major sources.

On August 5, 1994, the State of Maine formally submitted Chapter 138 as a SIP revision. On July 1, 1997, Maine submitted case-specific NOx RACT determinations for Maine Energy Recovery Company in Biddeford (MERC)<sup>3</sup>. On August 14, 1998, Maine submitted case-specific NOx RACT determinations as single source SIP revisions for the following facilities: FPL Energy's (formerly Central Maine Power) W.F. Wyman Station in Yarmouth<sup>4</sup>; Portsmouth Naval Shipyard (PNSY) in Kittery<sup>5</sup>; and S.D. Warren Company's (S.D. Warren) Westbrook Facility<sup>6</sup>. On October 9, 1997, Maine submitted an amendment to the case specific NOx RACT determination for PNSY in Kittery.

#### **3.2 15 percent Rate of Progress Requirements**

Section 182(b)(1) of the 1990 CAAA requires that states identify and adopt strategies which will reduce 1990 volatile organic compounds (VOC) emissions by at least 15 percent and for moderate areas by enough so as to attain NAAQS ozone standards by November 15, 1996. The CAA require all moderate and more severe ozone nonattainment areas to reduce volatile organic compound (VOC) emissions by at least 15 percent from a 1990 baseline net of growth, by November 15, 1996. This requirement is

<sup>3</sup> The emission rate at this facility was reduced from 0.476 lb/mm Btu to 230 ppmv bubble

<sup>4</sup> Units 1, 2, 3 and 5 installed low-NOx burners.

<sup>5</sup> All boilers at the PNSY were reduced from a 0.5 lb/mm Btu emission rate to a 0.35 lb/mm Btu emission rate.

<sup>6</sup> Emission rates on boilers 17, 18, 19 and 20 were reduced from 0.45 lb/mm Btu to 0.30 lb/mm Btu.

commonly known as the 15 Percent Rate or Progress Plan or 15% Plan. Maine initially submitted its 15% Plan and 1990 Base Year Emissions Inventory for Planning Area 1 (York, Cumberland and Sagadahoc Counties) on July 19, 1995. Maine's 15% Plan was deemed "administratively and technically complete" by EPA in 1995, but was never approved. On June 9, 2005, Maine submitted a revised 15% Plan illustrating that it has satisfied its statutory obligation to reduce VOC emissions by 15 percent net of growth, through a variety of state and federal control measures<sup>7</sup>. The Department's 15% Plan was approved by EPA on March 24, 2006 (71 FR 14815).

### **3.3 Attainment Demonstration**

On April 30, 2004, the U.S. Environmental Protection Agency (EPA) issued a final rule for implementing elements of the 8-hour National Ambient Air Quality Standard for ozone. This rule also provided options for states with areas (such as the Portland 1-Hour Ozone Nonattainment Area) having outstanding one-hour attainment demonstration requirements. One option, known as the 5 percent increment of progress, involves the submission of a Reasonable Further Progress (RFP) plan that provides a 5% increment of emission reductions from the area's 2002 emission baseline, which must be in addition to measures already in the SIP as of June 15, 2004. The Department submitted a 5 Percent Increment of Progress Plan demonstrating that Maine has adopted control measures providing a 5% reduction in VOC emissions from the Portland 1-Hour Ozone Nonattainment Area by 2007 on June 9, 2005. This plan was approved, by EPA on March 24, 2006 (see 71 FR 14815).

## **4.0 PERMANENT AND ENFORCEABLE EMISSION REDUCTIONS**

The air quality improvements in the Portland Nonattainment Area, as verified by the lower design value, are due to the implementation of permanent and enforceable emissions reductions of both volatile organic compounds (VOCs) and nitrogen oxides (NOx) from a wide variety of stationary, area and mobile sources. Similar control programs in upwind states have also decreased emissions during this time period.

### **4.1 Emissions Inventory - General**

The 1990 Clean Air Act Amendments (CAAA) required a 1990 base year inventory that includes both anthropogenic and biogenic sources of ozone precursors, volatile organic compounds (VOC) and nitrogen oxides (NOx). Periodic inventories are required every three years until the area is redesignated to attainment. The Department is using its final 2002 National Emissions Inventory as the basis for developing the 2006 redesignation inventory of point, area and mobile sources. Emissions were developed for future years by applying the appropriate growth factors, as obtained from the Bureau of Labor Statistics (BLS) forecast of economic activity (i.e. the EGAS model).

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<sup>7</sup> The Courts have ruled that in the event a statutory deadline is missed, the effective deadline becomes "as expeditiously as practicable", hence the 2005 demonstration date of Maine's updated 15% Plan

The inventory for the Portland Nonattainment Area is composed of point, area, and mobile sources of NO<sub>x</sub>, VOC, and CO emissions, expressed as tons per summer weekday. Emissions data are based on a number of factors including 2005 levels of industrial activity, 2005 population (estimated from census year 2000), and 2005 vehicle miles traveled for a typical summer weekday, and have been prepared according to EPA guidance and requirements. Mobile sources include both on-road vehicles, whose emissions were estimated with EPA's model MOBILE 6.2.03 and off-road vehicles, whose emissions were estimated with EPA's NONROAD2005

Mobile sources continue to dominate as the major source of ozone precursor emissions in the Portland Nonattainment Area. On-road mobile sources have been the greatest source of both VOC and NO<sub>x</sub> emissions for several decades, and will continue to be the single greatest inventory sector, despite an overall trend of decreasing emissions. Other significant sources of VOC and NO<sub>x</sub> emissions include non-highway sources and certain area sources (e.g. surface coating and consumer/commercial solvent use), and this trend continues into the next 10 years. While decreases in highway mobile source emissions are predicted, it will clearly remain a dominant source of ozone precursors in the three counties. Non-road emissions are also a significant source of ozone precursors, whose importance will increase in outlying years, based upon current growth factors

Detailed emissions inventory information is contained in Appendix D.

#### 4.2 Emission Control Programs

Tropospheric ozone is formed from the reaction of VOCs and NO<sub>x</sub> in the presence of sunlight, and as a result, strategies to reduce ozone have focused on reducing emissions of these ozone precursors. Although ozone concentrations in urban areas may be elevated due to concentrated local sources of emissions, both urban and rural areas are affected by regional transport, or the movement of ozone and its precursors by the wind.

Controlling both VOC and NO<sub>x</sub> emissions has proven to be most effective in reducing local ozone contributions, while NO<sub>x</sub> reductions are typically more effective at reducing regional transport. As a result, ozone can be most successfully reduced through a combination of local programs controlling both ozone precursors, and regional programs that are focused on controlling NO<sub>x</sub> emissions

##### 4.2.1 Emission Control Programs Implemented Prior to 2002

The following emission control programs were implemented by the State of Maine prior to 2002. Citations to EPA approval of state rules are given in Appendix E. Unless noted otherwise, all rules are implemented statewide. These programs represent emission reductions prior to the federal 8-hour ozone nonattainment designation, but continue to provide real and permanent decreases in emission from the affected source categories,

especially for those source categories (e.g., nonroad engines) where source turnover/replacement is an important element of rule penetration

### Control Programs Implemented Prior to 2002

<u>State Control Program</u>	<u>Implementation Date</u>
Fuel Volatility (RVP) Reductions to 9.0 psi	May 1, 1989
Stage I Vapor Recovery (>250,000 gal. annual throughput)	October 1, 1989
Cutback and Emulsified Asphalt VOC Restrictions	January 1, 1994
NOx RACT <sup>8</sup>	May 31, 1995
Non-CTG VOC RACT	May 31, 1995
Stage I Vapor Recovery (>10,000 gal monthly throughput)	May 31, 1995
Solvent Degreaser Control	May 31, 1995
Surface Coating Control*	May 31, 1995
Rotogravure and Flexography/Printing Control	May 31, 1995
Stage II Vapor Recovery (1,000,000 gal or greater annual throughput) <sup>9</sup>	Nov 15, 1996
Bulk Terminal VOC Reduction	May 31, 1996
Motor Vehicle Inspection and Maintenance in Cumberland County	January 1, 1999
Low Volatility Fuel Program in southern Maine (7.8 RVP) <sup>10</sup>	May 1, 1999
High Pollution Vehicle Retirement Pilot Program	November 1, 2000

*\*As part of the surface coating rule, the Department has incorporated by reference MACT standards for aerospace manufacturing and rework, shipbuilding and repair, and wood furniture manufacturing.*

<u>Federal Control Program</u>	<u>Implementation Date</u>
Federal Motor Vehicle Control Program (FMVCP)	Prior to 1990
Federal Fuel Volatility (RVP) Reductions to 9.0 psi	1992
Tier I (Post 1990 Vehicle Standards)	February 19, 1993
Small Engine Standards	Phase I 1996
Treatment Storage and Disposal Facilities	Phased program starting 1996
Architectural and Industrial Maintenance Coatings	1999

<sup>8</sup> This rule is applicable in York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Lincoln, and Knox counties

<sup>9</sup> This rule is applicable in York, Cumberland and Sagadahoc counties

<sup>10</sup> This rule is applicable in Androscoggin, York, Cumberland, Knox, Lincoln, Kennebec, and Sagadahoc counties

Autobody Refinishing	1999
Onboard Vapor Recovery Systems	Phased program starting 1998
Consumer Products	1998
Diesel Truck and Bus Engines	Phase I 1990
	Phase II 1998
Non-Road Diesel Engines	Phase I 1996
	Phase II 1999-2007
Lawn and Garden equipment	Phase I 1997
Pleasure craft	1998
Aircraft	Phase I 1996
Marine vessel	1998
National Low Emission Vehicle Program	1999

#### **4.2 Emission Control Programs Implemented After 2002**

The following control programs represent real and permanent decreases in emissions achieved after 2002.

##### **4.2.1 Highway Mobile Source Emission Control Programs**

###### **Federal Motor Vehicle Emission Control Program (FMVCP)**

The Federal Motor Vehicle Program, enacted prior to 1990, created significant reductions in vehicle emissions by establishing emission standards for new motor vehicles. These emission standards have become increasingly stringent over the years, providing significant reductions of both VOC and NOx. As the vehicle fleet "turns over", older generation vehicles are replaced with new vehicles meeting the more stringent emission standards. Fleet turnover is the principal mechanism by which more motor vehicle emission standards result in reduced emissions.

The Tier I vehicle emission standards for automobiles and light-duty trucks were phased in beginning in 1994, the national low emission vehicle program (NLEV) began in 1999, and the Tier II vehicle emission standards began in 2004. These reductions are quantified in the highway mobile model (Mobile 6.2.03) runs in Appendix D.

###### **California Low Emission Vehicle Program**

Beginning with the 2000 model year, Maine began implementing the California Low Emission Vehicle Program (LEV), which provides significant emission reductions above and beyond the federal Tier I and NLEV programs for passenger cars and light duty trucks. In 2004, Maine began implementing the California Low Emission Vehicle II (LEV2) program, which further reduces on-highway mobile source emissions from new passenger cars, light duty trucks, medium duty vehicles, and

heavy-duty diesel vehicles. EPA only allows the Maine DEP to take credit for 90% of the total credit allowed for by the California Low Emission Vehicle II (LEV2) program (see 70 FR 21959; April 28, 2005).

Quantification of these reductions is contained in the highway mobile model (Mobile 6.2.03) runs in Appendix D.

#### Federal Heavy-Duty Engine and Vehicle Standards (2004/2007)

The federal heavy-duty engine and vehicle standards were phased-in beginning in 2004<sup>11</sup> and will provide significant reductions in nitrogen oxides (and particulates). Beginning in 2007, more stringent standards based on the use of high-efficiency catalytic exhaust emission control devices (or comparable technologies) will reduce NOx emissions by 95 percent. NOx and non-methane hydrocarbon standards will be phased in between 2007 and 2010 for diesel engines, and gasoline engine requirements will be phased-in between the 2008 and 2009 model years. Quantification of these reductions is contained in the highway mobile model (Mobile 6.2.03) runs and the non-road emission runs in Appendix D.

#### Low Sulfur Gasoline

Beginning in 2004, gasoline sulfur limits were phased down, with fuel sulfur in 2006 limited to 30 parts per million (ppm). These reduced gasoline sulfur levels improve catalytic converter efficiency and longevity, thereby providing greater emission reductions from on-road gasoline powered vehicles. These emission reductions are also contained in the highway mobile runs in Appendix D.

#### On-Road (2006) and Non-Road Diesel Fuel (2010)

Federal rules require the use of ultra-low sulfur (15 parts per million) diesel fuel beginning in 2006 for on-highway diesel fuel, and 2010 for most non-road diesel fuel. These fuels enable the use of aftertreatment (post-combustion) technologies for new diesel engines, reducing both NOx and particulate emissions. These emission reductions are contained in the highway mobile runs and non-road modeling runs in Appendix D.

#### Federal Nonroad Engine Standards

EPA has established emission standards for a number of nonroad engine categories. These engines operate in a wide variety of applications, including construction equipment, marine vessels, lawn and garden equipment, and locomotives.

#### Land-Based Diesel Engines

In 1994, EPA adopted the first set of emission standards ("Tier 1") for all new nonroad diesel engines greater than 37 kilowatts except those used in locomotives and marine vessels. The Tier 1 standards reduced NOx emissions from these

<sup>11</sup> There are two phases of on-road standards, the first in 2004 and the second in 2007.

engines by 30 percent. EPA has since adopted more stringent standards for NOx, hydrocarbons (HC) and particulate matter. Tier 2 standards were phased in between 2001 and 2006, while Tier 3 standards will be phased in between 2006 and 2008. The Tier 2 and Tier 3 standards will further reduce nonroad diesel engine NOx emissions by 60 percent from Tier 1 levels.

#### Land-Based Spark Ignition Engines

EPA regulates three broad categories of nonroad spark-ignition engines: small spark ignition engines, large spark-ignition engines and recreational vehicles. Small engines below 19 kW (25 horsepower) are typically used in lawn and garden equipment such as lawnmowers, string trimmers, and chainsaws. These engines have been regulated for HC (hydrocarbons), NOx and carbon monoxide since 1997 under a multiphase approach. The Phase 1 standards resulted in a 32 percent reduction in hydrocarbon levels from these engines. (Phase 2 standards for small engines were phased-in between 2001 and 2007, and provide an additional 60 to 70 percent reduction in HC and NOx emissions (depending on the application).

Large nonroad spark ignition engines (greater than 19kW) are typically used in industrial equipment such as forklifts, airport service equipment, generators, and welders. The federal emission standards for large spark-ignition engines are also phased-in, with the first standards becoming effective in 2004, and more stringent standards requiring a 90 percent reduction in NOx and HC emissions along with reduced evaporative losses taking effect in 2007.

The recreational vehicle category includes off-highway motorcycles, all-terrain vehicles, and snowmobiles that operate on gasoline. In 2002, EPA adopted emission standards for new recreational vehicles that will be phased-in beginning in 2006. These standards will reduce HC emissions from these vehicles by 67 percent.

Nonroad engine emissions were estimated through the use of EPA's Nonroad2005 model and are detailed in Appendix D.

The following five control programs adopted by Maine have been approved by EPA. Citations to EPA approval of these regulations are given in Appendix E.

#### Portable Fuel Container Spillage Control

The Department adopted its Chapter 151 Portable Fuel Container Spillage Control rule in 2003. This rule requires all portable fuel containers sold, or manufactured, in Maine to be equipped with an automatic shut-off device that stops fuel flow before the fuel tank overflows and an automatic device that closes and seals when it is removed from the fuel tank. In addition, portable fuel containers must be constructed

of low-permeability materials. The emission reductions attributable to this program are estimated in Appendix D.

#### Architectural and Industrial Maintenance Coatings

In 2004, the Department adopted its Chapter 151 Architectural and Industrial Maintenance Coatings rule. This rule regulates VOC emissions from approximately 51 categories of architectural and industrial maintenance coatings beginning January 1, 2006. The VOC emission reductions from this rule are detailed in Appendix D.

#### Mobile Equipment Refinishing and Repair

The Department's Chapter 153 Mobile Equipment Refinishing and Repair rule was adopted in 2003, and addresses VOC emissions from automobile and mobile equipment refinishing activities. This rule requires the use of high-efficiency application technologies, and establishes work practices and training requirements. The emission reductions from this rule are estimated in Appendix D.

#### Solvent Cleaning

In 2004, the Department amended its Chapter 130 Solvent Cleaners rule further reduce the emissions of VOCs from solvents used in solvent cleaning operations. The amended rule requires the use of very low vapor pressure solvents (1 mm mercury or less) in cold cleaners. These emission reductions are estimated in Appendix D.

#### Distributed Generation

The Department's Chapter 148 Emission From Smaller Scale Electric Generating Resources applies to all non-mobile generators having a capacity equal to or greater than 50 kilowatts installed on or after January 1, 2005. This regulation limits emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (PM), and carbon monoxide (CO) from smaller-scale electric generating units, and is expected to reduce emissions growth from these units.

#### Maximum Available Control Technology (MACT)

The CAAA require EPA to review and update its list of categories of industries that emit one or more of 188 listed toxic air pollutants, or Hazardous Air Pollutants (HAPS). For listed categories of major industrial sources, the law requires EPA to develop standards requiring those industries to achieve emission reductions equivalent to putting into place what is known as "maximum available control technology" (MACT). Many of the HAPS under these industrial categories of control are also VOCs, and compliance with these new MACT standards as they are promulgated will decrease VOC emissions from the affected industries.

### 4.3 Regional (Upwind) Emission Reductions

#### 4.3.1 VOC Controls

As noted previously, upwind states that contribute ozone and ozone precursors to Maine have also implemented a wide range of NO<sub>x</sub> and VOC controls that contributed to attainment of the 8-hour ozone standard in Maine. In 2001, the membership of the Ozone Transport Commission (OTC) committed to the development and implementation of model rules for a number of VOC sources. These rules (or the equivalent) have been adopted in a number of states upwind of Maine, and have reduced upwind transported emissions of both ozone and its precursors.

At the federal level, EPA has adopted a number of mobile and area source controls targeted toward reducing VOC emissions.

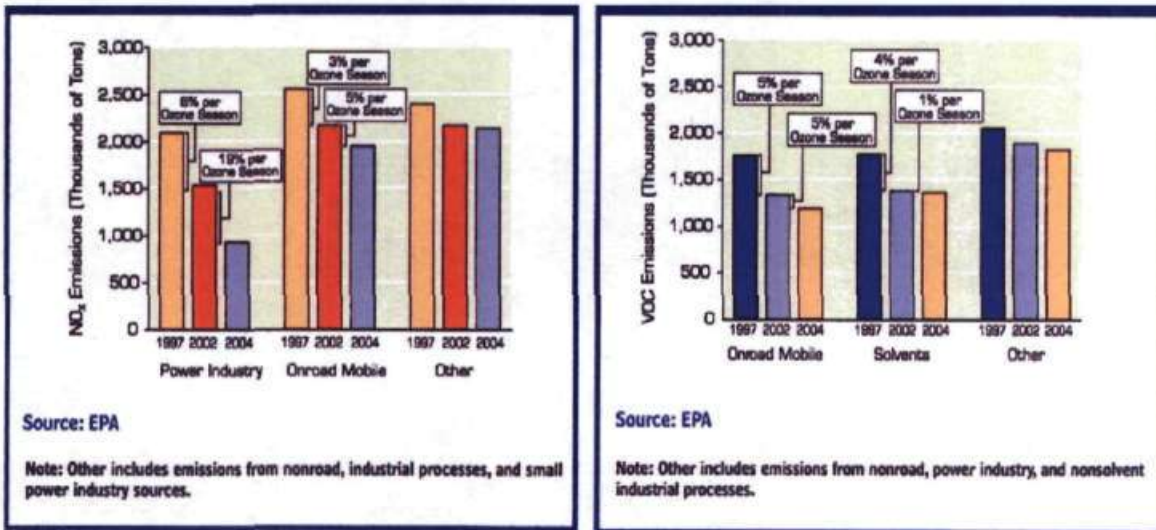
#### 4.3.2 NO<sub>x</sub> Controls

In September of 1994, the OTC adopted a memorandum of understanding to achieve regional reductions of NO<sub>x</sub> in three phases, beginning with the installation of reasonably available control technology (RACT). Phase I and II of the program (the "NO<sub>x</sub> Budget Program") was modeled on the cap and trade principle, and established a de facto 0.15 lbs/mmBtu NO<sub>x</sub> emission rate for participating electric generating units and large industrial boilers. By the beginning of 2003, the 10 participating jurisdictions had reduced their emissions more than 50 percent from 1990 baseline levels.

Meanwhile, in 1998, EPA had issued a regulation to reduce the regional transport of ground level ozone. This rule, the NO<sub>x</sub> SIP Call, required 22-states and the District of Columbia to reduce ozone season emission of NO<sub>x</sub>. Compliance with the NO<sub>x</sub> SIP call began on May 1, 2003 for the OTC states<sup>12</sup>, and on May 31, 2004 for states outside the Ozone Transport Region. Although the NO<sub>x</sub> SIP Call provided states with the flexibility of designing their own programs to meet their NO<sub>x</sub> reduction requirements, all affected states have chosen to participate in a regional cap and trade program. While Maine was not included in the NO<sub>x</sub> SIP call, this rule has had a significant effect on transported NO<sub>x</sub> and ozone, reducing upwind NO<sub>x</sub> emissions from 819,000 tons in 2003 to 593,000 tons in 2004<sup>13</sup>.

<sup>12</sup> The NO<sub>x</sub> SIP Call superseded Phase III of the OTC NO<sub>x</sub> Budget Program.

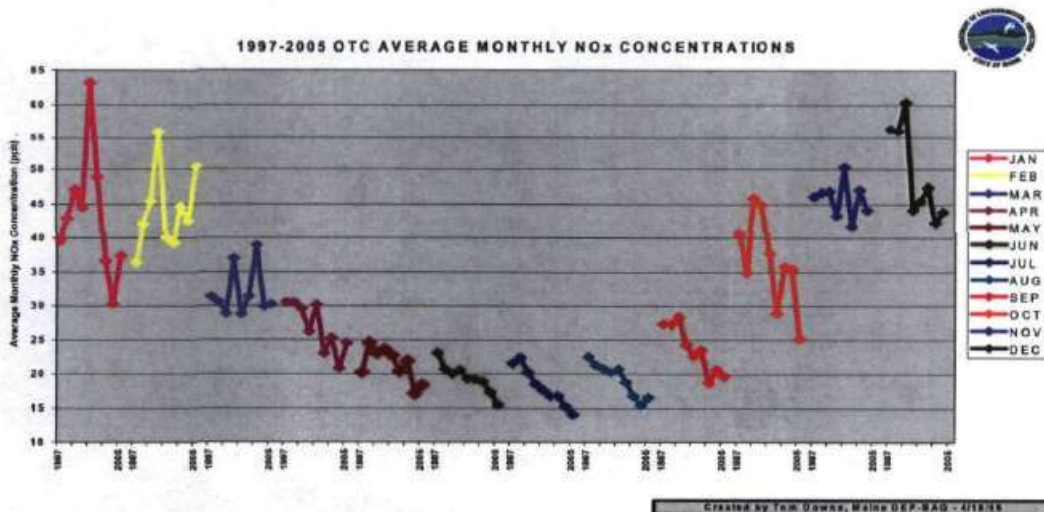
<sup>13</sup> For comparison, NO<sub>x</sub> Budget Program sources in the 22-states NO<sub>x</sub> SIP Call region emitted 1,222,000 tons during the 2000 ozone season.



**Ozone Season NO<sub>x</sub> and VOC Emissions in the Eastern United States by Category: 1997, 2002 and 2004**

**Figure 5**

The Maine Department of Environmental Protection analyzed average monthly NO<sub>x</sub> and Total Non-Methane Organic Compound (TNMOC) concentrations at Photochemical Analysis Monitoring System (PAMS) sites throughout the Ozone Transport Region during the period from 1997 through 2005. Our analysis confirmed that state, regional and federal emission control initiatives have resulted in both decreased emissions and decreased ambient concentrations of NO<sub>x</sub> and during the ozone season.



**Figure 6**

D&amp;D

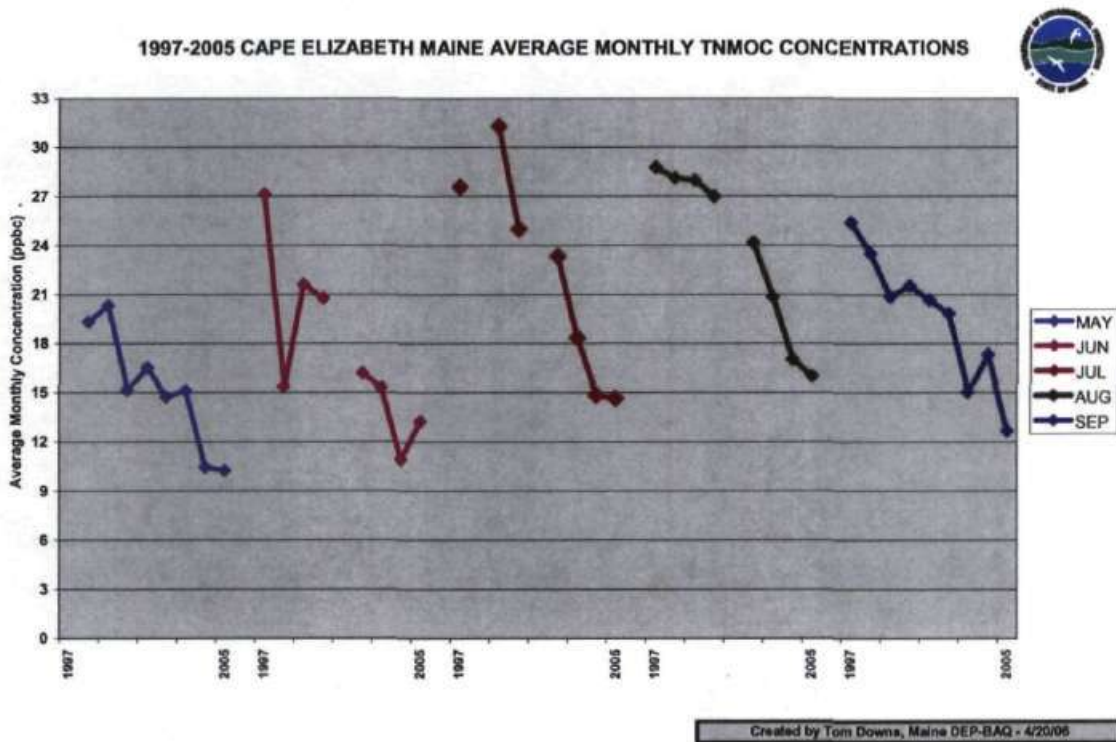


Figure 7

## 5.0 COMPLIANCE WITH PART D AND SECTION 110 OF THE 1990 CAAA

Section 107 of the CAAA requires that nonattainment areas considering redesignation comply with Part D and section 110 of the CAAA.

### 5.1 Enforcement of the Existing Ozone State Implementation Plan

This SIP revision incorporates federal requirements for demonstrating that the ozone standard can be maintained in future years in the Portland Nonattainment Area. All existing RACT controls required in these counties will remain in effect after redesignation to attainment. The Department RACT rules affect both facilities that emit or have the potential to emit 40 tons or more per year of volatile organic compounds (e.g., the Chapter 134 Reasonably Available Control Technology For Facilities that Emit Volatile Organic Compounds regulation) and facilities with much lower applicability thresholds (e.g., the Chapter 129 Surface Coating Regulations). Appendix E provides a listing of current SIP-approved rules for the State of Maine.

### 5.2 Permitting of Existing, New, or Modified VOC Sources

Stationary sources are required to (1) obtain permits for all new, modified, and existing sources, (2) operate in compliance with applicable laws and regulations, (3) test equipment, and (4) keep detailed records. Chapter 137 of the Department's Regulations, Emission Statements, establishes requirements for the annual reporting of pollutant emissions from stationary sources of air pollution. In addition, the Department has the authority to conduct a program of periodic inspections and surveillance, to enter property at any reasonable time for the purpose of inspection for possible violations, to require the submission of plans from any permit applicant, and to require the submission of reports regarding actual or potential violations.

The Department, in compliance with Title I, Part D of the 1990 CAAA, has adopted rules for preconstruction review of new sources and modifications to existing sources (NSR). Chapter 115 requires any new source or modification acceptable for processing after November 15, 1992 will be subject to new source requirements in Title I, Part D of the 1990 CAAA and Chapter 113 and Chapter 115 of the Department's regulations. Chapter 140 of the Department's regulations establishes an operating permit program for major stationary sources of air pollution pursuant to Title V of the 1990 CAAA. This regulation addresses control technology requirements, air quality impact analysis requirements, license conditions and public participation and other procedural requirements for license renewals as well as new sources and modifications of existing sources. New source review permitting applies to new and modified major sources of NOx as well as other regulated pollutants.

All information and data submitted in a license application is available for public disclosure. Any exception to this general rule is determined by the provisions of the Right to Know Law, Title 1 M.R.S.A. Section 401.

### 5.3 Monitoring of Stationary Sources

The Department has legal authority to require facilities to install, maintain, and use emission monitoring devices. Sources are required to make periodic submittals to the Department on the nature and quantity of emissions. Chapter 117, Source Surveillance, specifies which air emission sources are required to operate continuous emission monitoring systems (CEMS), and details the performance specifications, quality assurance requirements and procedures for such systems, and recordkeeping and reporting requirements. Chapter 137, Emission Statements, requires sources to file annual emission statements beginning July 1, 1994, and annually every year after that by July 1.

The Department is required to make this information available for public inspection, including any reports correlating source emission data with the applicable emission standards and limitations.

#### 5.4 Legal Authority and Resource Commitments

The legal authority for the Department to carry out the implementation plan is established in 38 Maine Revised Statutes Annotated, Chapter 2. This legislation establishes the Department of Environmental Protection, its purpose, and responsibilities. The Board of Environmental Protection fulfills its purpose through rulemaking, decisions on selected permit applications, review of the Department's licensing and enforcement actions and recommending changes in the law to the Legislature.

The Department will continue providing adequate funding and personnel to maintain the provisions of this plan necessary for meeting the air quality standards.

#### 5.5 Legal Authority to Enforce Applicable Laws, Regulations, and Standards

The Board's orders may be enforced by the Department or by the State of Maine's Attorney General. The Department, among other actions, may resolve the violation through an administrative consent agreement, refer the violation to the Attorney General, schedule and hold an enforcement hearing, or with prior approval of the Attorney General, initiate a civil action.

#### 5.6 Conflict of Interest

Section 128 of the 1990 CAAA requires that a majority of members of any board that approves permits or enforcement orders to represent the public interest, not derive a significant portion of their income from persons subject to the permits or enforcement orders and disclose any potential conflict of interest. Both the Board and the Department have the authority to issue permits and are involved in enforcement actions.

Board members are appointed by the Governor and subject to review by the joint standing committee of the Legislature having jurisdiction over energy and natural resource matters and to confirmation by the Legislature. Members of the Board are chosen to represent the broadest possible interest and experience that can be brought to the Board.

#### 5.7 Provision for Revising the Plan

The Department will revise this maintenance plan as necessary in response to revisions of the ozone NAAQS or to take advantage of improved or more expeditious methods of maintaining the standard. The Department will also revise the maintenance plan as necessary to comply with the EPA's finding that the maintenance plan is inadequate to attain or maintain the NAAQS, or every eight (8) years in compliance with Section 175(A) of the 1990 CAAA.

### 5.8 Conformity

In addition to a wide range of requirements for the control of VOC and NOx emissions, the 1990 Clean Air Act Amendments (CAA) established specific provisions regarding the conformity of transportation actions. Section 176(c)(4) of the CAA requires transportation plans, programs, and projects which are funded or approved under Title 23 U.S.C. or the Federal Transit Act to conform with State or Federal air quality implementation plans. Conformity is defined in the CAA as conformity to a SIP's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards, and achieving expeditious attainment of these standards. In addition, activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or the emission reductions needed for attainment.

On November 24 1993, EPA promulgated regulations for transportation conformity (40 CFR Parts 51 and 93), requiring metropolitan planning organizations (MPOs)<sup>14</sup> and the U. S. Department of Transportation (US DOT) to make conformity determinations on metropolitan transportation plans and transportation improvement programs (TIPs) before they are adopted, approved or accepted. In addition, highway or transit projects which are funded or approved by the Federal Highway Administration or the Federal Transit Administration must also receive a conformity determination before they can be approved or funded by US DOT or an MPO. The federal rule applies in all nonattainment areas, or areas with maintenance plans for ozone, carbon monoxide, nitrogen oxides or particulate matter.

The transportation conformity rule has been amended several times, including on July 1, 2004, when EPA issued a final rule to implement conformity for the 8-hour ozone NAAQS<sup>15</sup>. The transportation conformity rule was also modified on both May 6, 2005, and March 10, 2006.

The criteria for meeting a conformity determination differ according to the pollutant for which an area has been designated nonattainment or maintenance, and according to the approved control strategy implementation plan revision. In addition to transportation plans and TIPs, all regionally significant highway and transit projects must come from either a conforming transportation plan and TIP, been included in the regional emissions analysis of the plan and TIP supporting the plan, or be included in a newly performed regional analysis.

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<sup>14</sup>In areas that are not contained within an MPO, the state Department of Transportation is responsible for conformity determinations. In Maine, due to its rural nature, only four urban areas are served by metropolitan planning organizations (Kittery, Portland, Lewiston/Auburn and Bangor).

<sup>15</sup> 40 CFR Part 93, Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas, Transportation Conformity Rule Amendments Response to Court Decision and Additional Rule Changes, at 69 FR 40003.

Conformity determinations are made by demonstrating consistency with adequate or EPA-approved motor vehicle emissions budgets established by rate of progress, attainment demonstration SIPs or other control strategy implementation plans. Section 176(c)(2)(A) of the CAAA specifically requires conformity demonstrations to show that emissions from transportation plans and programs are consistent with estimates of emissions from motor vehicles and necessary emissions reductions as established by reasonable further progress, attainment and maintenance demonstrations contained in the SIP. Motor vehicle emissions budgets are the explicit or implicit identification of the motor vehicle related portions of the projection inventory used to demonstrate reasonable further progress milestones, attainment or maintenance for a particular year identified in the SIP. The motor vehicle emissions budget establishes a cap on emissions which cannot be exceeded by predicted highway and transit vehicle emissions.

On June 9, 2005, the Department submitted a 5 Percent Increment of Progress Plan to EPA that established an explicit on-road motor vehicle emission budget pursuant to 40 CFR Section 93.118.<sup>16</sup> The 2007 motor vehicle emissions budget established for the Portland 8-hour ozone nonattainment area by the 5 Percent Increment of Progress Plan was 20.115 tons per summer weekday (tpswd) of VOC and 39.893 tpswd NOx, which is the level of on-road emissions as conservatively modeled under the "no-build" scenario within the STIP using MDOT modeling assumptions. The Federal Register citation for the approved MVEBs is 71 FR 14815, (March 24, 2006), effective April 24, 2006, and incorporated into the Federal Code of Federal Regulation at 40 CFR 52.1023(f).

40 CFR Section 93.118(b)(2) provides that when a maintenance plan has been submitted (as in this redesignation request), motor vehicle emissions must be less than or equal to the motor vehicle emissions budgets established for any other years for which the maintenance plan establishes motor vehicle emissions budgets.

The Department utilized the Mobile 6.2.03 model to calculate on-road emissions of VOC and NOx for the 57 towns in York, Cumberland, Sagadahoc and Androscoggin County comprising the 8-hour nonattainment area (See Appendix F)<sup>17</sup>. Maine is establishing motor vehicle emissions budgets for the last year of the Portland 8-hour ozone maintenance plan (year 2016) at 16.659 tpswd of VOC and 32.837 tpswd of NOx. These on-road mobile source emissions when added to emissions from all other inventory sources [stationary, other mobile (i.e., non-road, marine vessels, airplanes, locomotives) and area sources] result in year 2016 emissions inventories lower than the year 2005 attainment emissions inventory.

For the Portland Nonattainment Area, conformity will continue to be demonstrated through the current 2007 VOC and NOx emissions budgets. Once the motor vehicle emissions budgets contained in this redesignation request are determined adequate or

<sup>16</sup> Final approval for this plan was published in the Federal Register on March 24, 2006.

<sup>17</sup> Maine Department of Transportation provided VMT estimates (by vehicle class) for each town, these VMT estimates were then applied to the 2007 emission factors as modeled by Mobile 6.2.03.

approved into the SIP the new motor vehicle emissions budgets will also be used for analysis years 2016 and later.

## **6.0 MAINTENANCE PLAN**

Section 175A of the Act sets forth the elements of a maintenance plan for areas seeking redesignation from nonattainment to attainment. The plan must demonstrate continued attainment of the applicable NAAQS for ten years after the area is redesignated. Section 175A(b) of the Act requires that eight years after formal redesignation, the state continues to provide for maintenance of the standard for an additional ten years. The ME DEP commits to submit to U.S. EPA a plan for future maintenance of the standard in Portland area as required. To provide for the possibility of future NAAQS violations, the maintenance plan must contain contingency measures, with a schedule for implementation, adequate to assure prompt correction of any air quality problems. EPA requires the following provisions to ensure maintenance of the NAAQS:

1. An attainment emissions inventory to identify the level of emissions in the area which is sufficient to attain the NAAQS.
2. A state may generally demonstrate maintenance by showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory over the 10-year period following redesignation.
3. Once an area has been redesignated, the state must continue to operate an appropriate air quality monitoring network in order to verify the area's attainment status.
4. The state must ensure that it has the legal authority to implement and enforce all measures necessary to attain and maintain the NAAQS. Continued attainment must be verified by the state through the tracking of the maintenance plan.
5. Contingency measures must be available to promptly correct any NAAQS violation.

The Department has developed the following maintenance plan to ensure that continued attainment will be achieved in the Portland Nonattainment Area

### **6.1 Attainment inventory**

Pursuant to the CAA, states must develop an attainment emissions inventory to identify the level of emissions sufficient to achieve the NAAQS. This inventory should be consistent with EPA's most recent guidance on emission inventories for nonattainment areas available at the time, and should include emissions during the time period associated with the monitoring data showing attainment of the ozone NAAQS. Where the state has made an adequate demonstration that air quality has improved as a result of

the SIP, the attainment inventory will generally be the actual inventory during the time period the area attained the standard. The inventory must be based on "typical summer day" emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) during the attainment year.

Maine has developed an emissions inventory on a whole county basis that identifies the level of emissions sufficient to achieve the NAAQS. The attainment inventory consists of the actual emissions for a year during the three-year period associated with the monitoring data showing attainment of the ozone standard (2003-2005). Maine has chosen to use 2005 emissions as its attainment inventory because it represents the typical inventory for the three-year period demonstrating attainment<sup>18</sup>. The State of Maine 2005 emissions inventory is consistent with EPA guidance, is based on "typical summer day" emissions of VOC and NOx during 2005, and consists of a list of sources by tons of emissions produced. Appendix D provides a detailed accounting of the 2005 attainment inventory.

## 6.2 Maintenance demonstration

EPA Redesignation Guidance provides for demonstrating maintenance of the NAAQS through the use of either an emissions inventory approach (where a state demonstrates that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory), or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS.

The maintenance demonstration should be for a period of 10 years following the redesignation, and should consider future growth, including population and industry, be consistent with the attainment inventory, and document data inputs and assumptions. All elements of the demonstration should be consistent with current EPA guidance. Enforceability through regulations must also be demonstrated.

Any assumptions concerning emission rates must reflect permanent, enforceable measures. A state generally cannot take credit for reductions unless there are regulations in place requiring those reductions or the reductions are otherwise shown to be permanent. Therefore, the state is expected to maintain its implemented control strategy despite redesignation to attainment, unless such measures are shown to be unnecessary for maintenance or are replaced with measures that achieve equivalent reductions. Emission reductions from source shutdowns can be considered permanent and enforceable to the extent that those shutdowns have been reflected in the SIP and all applicable permits have been modified accordingly.

Maine has chosen to utilize the emissions inventory approach to demonstrate that its future emissions of ozone precursors will not exceed the level of the 2005 attainment

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<sup>18</sup> The 2005 inventory is also a standard periodic (i.e., every three years) inventory as required pursuant to section 172(c)(3) of the Act.

inventory, and has projected emissions to 2016, which is 11 years after attainment.<sup>19</sup> Figure 9 demonstrates that future emissions of VOC and NOx (on a whole county basis) will not exceed the level of Maine's 2005 attainment inventory (also on a whole county basis) for a 10-year period following redesignation. The projected emissions reflect the expected summertime emissions based on enforceable emission rates and typical production rates.

The Department's primary maintenance strategy is the California Low Emission Vehicle Program. In addition, point and area source emission projections assume the use of reasonably available control technology on all source types covered by current control technology guidelines as well as other regulations adopted by Maine and approved by EPA into the SIP. Further discussion of the regulations in place to enforce emission reductions may be found in Section 4 of this plan.

		all emissions expressed in tons per summer week day					
		2005	2005	2009	2009	2016	2016
Category	Subcategory	VOC	NOx	VOC	NOx	VOC	NOx
Point		4 220	10 480	4 540	11 140	5 350	12 990
Nonpoint		41 557	6 301	42 579	6 491	47 331	6 723
Mobile	Onroad	27 033	55 328	20 018	38 849	13 243	19 078
Mobile	Nonroad	20 592	12 020	17 917	10 170	15 560	6 801
Mobile	Locomotives	0 019	0 645	0 017	0 570	0 015	0 477
	<b>Total</b>	<b>93 421</b>	<b>84 774</b>	<b>85 071</b>	<b>67 220</b>	<b>81 499</b>	<b>46 069</b>
			current pad	-8 350	-17 553	-11 922	38 704

**Attainment, Interim and Maintenance Inventories for  
York, Cumberland and Sagadahoc Counties**

**Figure 9**

Although EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed to determine the effect of national and regional emission control strategies on ozone air quality in Maine and throughout the eastern United States. These modeling analysis have demonstrated that the Portland Nonattainment Area is significantly impacted by transported ozone and ozone precursors, and that regional NOx reductions will provide significant ozone air quality improvements in this area.

<sup>19</sup> The maintenance plan must show that emissions 10 years after the date on which EPA approves the redesignation request will be lower than they were in the base year (2005) of the maintenance plan. The additional time is needed for EPA to complete its review and approval process.

### EPA Modeling Analysis for the Nonroad Land-based Diesel Engines Standards

In 2003, EPA conducted modeling to support the rulemaking for the Nonroad Land-based Diesel Engines Standards<sup>20</sup>. In its analysis, EPA used the Comprehensive Air Quality Model with Extensions (CAMx) to evaluate the impacts of the proposed emission reductions on future air quality levels. Base year emissions from 1996 were modeled for three ozone episodes (June 12-24, 1995; July 5-15, 1995, and August 7-21, 1995) that are representative of differing sets of meteorological conditions. CAMx was used to predict future year ozone values using relative reduction factors under several base cases, including 1996, 2020 and 2030 emission levels. Results of this modeling show that under both the base case (without new rules on nonroad land-based diesel engines) and under the control scenario (with these new rules), ozone monitors in the Portland Nonattainment Area would be meeting the 8-hour ozone NAAQS in both 2020 and 2030.

### EPA Modeling Analysis for the CAIR Rulemaking

More recently, EPA conducted a similar modeling analysis as part of the Clean Air Interstate Rule (CAIR) rulemaking<sup>21</sup>. In this analysis, EPA used CAMx version 3.10 to model the 1995 ozone episode meteorology (June 12-24, 1995, July 5-15, 1995, and August 7-21, 1995) for 2010 and 2015 under several future control scenarios. EPA's modeling predicted attainment of the 8-hour ozone NAAQS on a statewide basis for both the base case (emissions reflecting the net effects of economic growth and emissions reductions expected to result from existing and promulgated control programs), and with future emission reductions from CAIR.

The modeled future average ambient and projected 2010 and 2015 base case and CAIR control ozone concentrations for Maine as detailed in Appendix E to the CAIR Technical Support Document are illustrated in Figure 10. In each and every case, both the base case and CAIR control scenarios predict continued attainment of the 8-hour ozone standard in the Portland Nonattainment Area and other monitoring sites in Maine.

<sup>20</sup> "Technical Support Document for the Nonroad Land-based Diesel Engines Standards Air Quality Modeling Analyses", U.S. EPA Office of Air Quality Planning and Standards, April 2003

<sup>21</sup> "Technical Support Document for the Final Clean Air Interstate Rule, Air Quality Modeling", U.S. EPA Office of Air Quality Planning and Standards, March 2005

County	Average Ozone ppb 1999- 2003	2010 Base Case	2010 CAIR	2015 Base Case	2015 CAIR
Cumberland	84.7	75.9	75.8	73.4	73.0
Hancock	92.0	80.7	80.5	77.2	76.8
Kennebec	77.7	68.1	68.0	65.3	64.9
Knox	83.3	73.7	73.6	70.7	70.4
Oxford	61.0	54.9	54.7	53.2	52.7
Penobscot	83.0	72.8	72.6	70.0	69.5
York	89.0	80.3	80.2	78.0	77.6

**Average Ambient and Projected 2010 and 2015 Base and CAIR Control 8-hour  
Ozone Concentrations**

**Figure 10**

### **6.3 Air quality monitoring network**

Once an area has been redesignated, the state must continue to operate an appropriate air quality monitoring network in accordance with 40 CFR Part 58, to verify the area's attainment status. In cases where measured mobile source parameters (for example, vehicle miles traveled) have changed over time, the state may also need to perform a saturation monitoring study to determine the need for and location of additional permanent monitors. Maine is committing to the continued operation and maintenance of an acceptable air quality monitoring network for the Portland Nonattainment Area.

### **6.4 Verified continued attainment**

Pursuant to EPA requirements, the Maine must ensure that it has the legal authority to implement and enforce all measures necessary to attain and maintain the NAAQS. Sections 110(a)(2)(B) and (F) of the Act, and regulations promulgated in 40 CFR 51.110(k) suggest that one such measure is the acquisition of air quality and source emission data to demonstrate attainment and maintenance. The state submittal must indicate how the state will track the progress of the maintenance plan. This is necessary due to the fact that the emission projections made for the maintenance demonstration depend on assumptions of point and area source growth.

One option for tracking the progress of the maintenance demonstration would be to periodically update the emissions inventory. In this case, the maintenance plan should specify the frequency of any planned inventory updates. Such an update could be based, in part, on the annual update of EPA's national emissions inventory (NEI) database,

and could indicate new source growth and other changes from the attainment inventory (such as changes in vehicle miles traveled or in traffic patterns). As an alternative to a complete update of the inventory, the state may choose to do a comprehensive review of the factors that were used in developing the attainment inventory to show no significant change. If this review does show a significant change, the state should then perform an update of the inventory.

The state of Maine has the legal authority to implement and enforce specified measures necessary to attain and maintain the NAAQS. Key regulatory elements that the state will keep in place to maintain attainment are as follows

- 1 Existing source regulatory program requiring controls for certain source types for which EPA has defined reasonable available control technology in guideline documents; and
- 2 Requirement for controls for all major sources.

In addition to maintaining key elements of its regulatory program in place, the state will acquire ambient and source emission data to track attainment and maintenance.

Maine will track the progress of the maintenance demonstration by periodically updating the emissions inventory. This tracking will be performed annually in order to enable the state to implement contingency measures as quickly as possible. The update will be based, in part, on the annual update of the NEI, and will indicate new source growth and other changes from the attainment inventory, including changes in vehicle miles traveled or in traffic patterns and changes in MOBILE6.2 or its successor.

The state will report the results of this tracking program to EPA every three years

#### 6.5 Contingency plan

The maintenance plan must include contingency provisions, as necessary, to promptly correct any NAAQS violation that occurs after redesignation of an area. It should include measures to be adopted, a schedule and procedures for adoption and implementation, and a specific time limit for action. Specific triggers that would put the plan into motion must be identified. This plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are adopted explicitly once they are triggered.

As required by the EPA redesignation guidance, a contingency measure, (a control program or set of controls), must be clearly defined and be implemented within a reasonable time frame if there is a lapse in attainment

Despite the best efforts to demonstrate continued compliance with the 8-hour ozone NAAQS, the ambient ozone concentrations in this area may exceed or violate the NAAQS in the future. Therefore, as required by section 175A of the Act, Maine has

listed possible contingency measures in the event of a future ozone air quality problem. At the conclusion of each ozone season, the Maine DEP will evaluate whether the design value for the Portland nonattainment area is above or below the 8-hour ozone standard. If the design value is above the standard, the DEP will evaluate the potential causes of this design value increase. The DEP will examine whether this increase is due to an increase in local in-state emissions or an increase in upwind out-of-state emissions. If an increase in in-state emissions is determined to be a contributing factor to the design value increase, Maine will evaluate the projected in-state emissions for the Portland area for the ozone season in the following year. If in-state emissions are not expected to satisfactorily decrease in the following ozone season in order to mitigate the violation, Maine will implement one or more of the contingency measures listed in this section, or substitute a new VOC or NO<sub>x</sub> control measures to achieve additional in-state emissions reductions. The contingency measures(s) will be selected by the Governor or the Governor's designee within 6 months of the end of the ozone season for which contingency measures have been determined necessary. Possible contingency measures include:

#### Adhesives

Establish VOC content limits for industrial and commercial application of solvent-based adhesives and sealants based on California Air Resources Board (CARB) suggested RACT controls (1998).

#### Asphalt Paving

Reduce the VOC content limit for cutback asphalt from 5% to 4%, and lower current VOC content limits for emulsified asphalt by 20%.

#### Automobile Refinish Coatings

Adopt the VOC content limits captured in the Bay Area Air Quality Management District (BAAQMD) regulations.

#### Consumer Products

Adopt and implement the July 20, 2005 California Air Resources Board (CARB) regulations.

#### Rule Effectiveness Improvement

Increase enforcement of existing rules in order to increase effectiveness.

#### Small Source Non-CTG VOC RACT

Reduce the major source and Chapter 134 non-CTG VOC RACT applicability threshold from 40 to 10 tons per year of actual emissions.

## **7. CONCLUSION**

The Department has satisfied all applicable criteria for redesignation of the Portland Nonattainment Area from marginal nonattainment to attainment for the 8-hour ozone

NAAQS. The air quality monitoring data indicate that the NAAQS for ozone has been attained and the standard will be maintained in future years. Precursor emissions generated in, and transported to, the nonattainment area have decreased as demonstrated by both emission inventories and ambient monitoring, and should continue to decrease, ensuring that attainment of the standard will be continue to be maintained.